



The Role of Organic Farming for Sustainable Agriculture: An Approach to Economic Integrity

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

India is primarily known for its agriculture. Agriculture provides livelihood for over three-quarters of the people directly and indirectly. As a result, any advancement in agriculture is inextricably linked to the happiness and delight of the people of this country. Agriculture in the India continues to face major issues as the population grows. The growth of high-yielding crop increases the use of fertilizers and irrigation, and as a result of intense cropping techniques, weeds, insects, and pests emerge, wreaking havoc on the crop and its produce. Our economy is founded on property farming, particularly rainfed agriculture, in which vegetables play an important role in feeding humans, animals, and the environment. Country's most important post-independence worry has been feeding its fast expanding population in an increasing rate. As a result, high-yielding varieties are utilized in conjunction with irrigation water, fertilizers, and pesticides. This combination of high-yielding production has aided the country's development of a food surplus but in the same manner that destroys soil health, enhances environmental pollution, pesticide toxicity. As a result, agricultural systems that rely significantly on organic inputs rather than chemical fertilizers and pesticides are being rethought by researchers and experts. Organic agriculture would generate high-quality feed while also conserving the soil and, as a result, the environment's health; however, whether large-scale organic farming will be able to feed India's huge population remains to be seen. India produces certified organic solutions as well as all types of food products, such as basmati rice, pulses, honey, tea, spices, coffee, oilseeds, fruits, cereals, flavoring medications, and

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their by-products. Non-edible fresh produce includes cotton, clothing, cosmetics, practical food products, body care goods, and products. But the scope of increasing the organic farming is huge because in India most of the fertile land is cultivated with inorganic inputs.

Keywords: Organic farming; sustainable agriculture; certified organic; soil fertility; organic products; nature conservation.

1. INTRODUCTION

Modern agriculture is one of the major causes of global biodiversity reduction but these biodiversity conservation objectives has not given importance owing to higher crop production to feed the world [1]. Biodiversity revived through the organic agenda of Howard's artwork, which defined and theorised many of the viewpoints that have since become mainstream with the help of many who have become active in this community. Synthetic fertilizers, herbicides, growth regulators, and animal feed materials are likely to be avoided or limited in organic farming. Natural, social, and economical integrity are the cornerstones of organic farming [2]. Keeping long-term soil fertility by maintaining natural depend on stages, fostering soil organic interest, careful mechanical intervention, nitrogen self-sufficiency through the use of legumes and organic natural techniques, effective recycling of organic materials such as crop residues and farm human waste and weeds, and disease and pest control relying primarily on crop rotations and natural predators are just a few of the important characteristics [3]. To bridge the gap between NPK input and removal from the soil, a considerable emphasis is placed on preserving soil fertility by integrating all wastes into the soil, often through compost [4]. To meet their ever-increasing food demands, some countries have been compelled to use chemical materials and fertilizers to enhance farm output [5].

Long-term and excessive use of chemical chemicals, on the other hand, has resulted in human and soil health problems as well as pollution. As a result, farmers in wealthier countries are being encouraged to convert their existing farms to organic farms.

Now a days due to imphasis on health awareness most of the people is ready to pay high-price for normal foods and as a result the demand for organic products is continuously increasing. Customers who buys natural products are typically rich, well-informed, and health-conscious people who are motivated by strong consumer demand, low prices, and

environmental concerns. As a result of these hidden advantages, organic farming is becoming more popular. Subsidies, client education, and help in the form of research, training, marketing, and advertising are all part of European government programmes aimed at boosting the demands for it. India's agricultural techniques date over 4000 years, and organic farming is remarkably close to what we see now in the United States. Agriculture of the Vedic period exhibited remarkable competence in soil fertility, seed selection, plant safety, sown seasons, and flower endurance in a variety of locations, according to Arthashastra [6]. Farmers in historic India followed natural legal principles, which helped to sustain agricultural productivity for a longer length of time. Organic farming has been rising at an unanticipated rate of 20% per year over the last decade [7]. According to data, over 31 million hectares are under organic production, generating over 26 billion dollars in annual revenue [8]. Apart from the fact that organic food has been punished for relying on prior fertilization to build up soil phosphorus (P) and potassium (K) before switching to clean, organic food has been scolded for relying on prior fertilization to build up soil phosphorus (P) and potassium (K) [9]. Agriculture is one of the most important areas for socio-economic development in developing countries like India. It is necessary to ensure food security, alleviate poverty, and preserve critical organic resources [10], which can be accomplished through organic farming and other methods that do not jeopardize organic resources. The primary dilemma that motivates scientists is that feeding the ever-increasing population with natural food is extremely difficult [11]. One of the key needs of low-income foreign locations is secure production and a safe food supply. Arshad et al. [12] to restore their reservoirs. As a result, among public coverage, the idea of food safety includes agriculture, the environment, work income, advertisements, health, and vitamins. In comparison to modern agriculture, ancient farmers have their own set of laws and standards for maintaining soil health [13]. Whilst modern research discovered that thru the device of only organic inputs on my own the nutritional necessities of the crop could not be

fulfilled, mixing of these two can reap higher crop yields. The interaction between the inorganic and natural bear in mind might also additionally motive both decreases or increase soil vitamins, having a bet on the nutrient and planting cloth may be a query.

2. ORGANIC FARMING

In Germany, the current age of organic farming began in 1924. Rudolf Steiner embarked on a path known as the "social medical foundation of agricultural growth," in which he considered the individual as a vital component of biological balance and specialized in living in harmony with nature [14]. Pfeiffer developed biodynamic agricultural technology based on Rudolf Steiner's agricultural philosophy [15]. In the year 1930, Hans Mueler, a political figure in Switzerland, promotes organic agriculture approaches, and Maria Mueler cultivates orchards using organic techniques [16]. In his e-book "An Agricultural Testament," Sir Albert Howard establishes the foundation for the organic farming movement and summarises his 25 years of research in Indore, India, which evolved into support for historic composting processes. With his experiments, he strongly established a relationship between soil, plant, and animal health [17]. Mokichi Okada, a Japanese farmer, began developing organic farming techniques in 1935. He highlights the importance of nature and agricultural production working together to increase yields by building soil humus and announcing a ban on synthetic agrochemicals and fertilizers [18]. Likewise, Rodale J.I. of the United States has begun to practice organic farming. In 1942, he publishes his journal "organic farming," which nearly proves the restoration of natural soil fertility [19]. Organic farming progress began in the 1970s and continued until the 1990s [20]. In the 1960s, the organic agricultural industry began to expand internationally [21]. Particularly, it began to increase after the 1973 oil spill, when other people became aware of the importance of organic agriculture and its impact on the environment [22]. Those were the years when new ideas, social changes, protests, and changing life patterns were at their peak. Humans are now thinking about sustainable development through environmental protection, proper supply usage, and natural meals through the use of organic agriculture. In the year 1970, the principles of ecological agriculture were introduced with the help of William Albrecht's method, which proved to be useful in expanding the concept of organic farming. As a result,

IFOAM was founded in 1972. It grew to become the most crucial non-governmental organization.

This contributes to the expansion of organic agriculture [23]. Throughout this period, unique enterprises and agencies (e.g., FNAB, FIBL) of natural agricultural significance were founded. These organizations execute organic product criteria and play a role in attracting people's attention [13]. Exquisite countries are gradually enacting organic agriculture legislation. Organic farming legislation was enacted in the US states of Oregon and California in 1974 and 1979, respectively [24]. In addition, in the year 1985, France begins to formulate organic farming-related regulations. Trends in organic farming reached the new boom phase during the 1990s. Many trade organizations arose, and both government and non-government organizations began pushing for the use of organic farming rather than artificial fertilizers. During this time, Germany hosted the most prominent and hence primary Bio Fach Fair, which provides the largest advertising platform for organic product development [20]. In 1990, the United States government implemented organic food laws, and the European Union's organic agriculture regulations were followed by the European Commission in 1991. Since the year 1994, these guidelines have been followed with the help of all European member countries. In the year 1999, organizations such as the FAO and IFOAM made changes to organic product manufacturing, combining marketing and huge labeling with the use of pointers on organic products. These programs and legislation allow for a stronger position of natural property in agricultural tools, as well as environmental preservation, paving the path for long-term improvement [24,25].

3. PRINCIPLES OF ORGANIC FARMING

The International Federation of Organic Agriculture actions (IFOAM) shows 4 primary thoughts on which organic farming is based totally: fitness, Ecology, equity and Care.

- I) Health – Organic farming ought to decorate soil health, for this reason, maintaining vegetation, animals, and people nevertheless due to the truth the planet.
- II) Ecology – Organic farming wants to assist organic cycles, and dwelling systems and help in sustaining them.
- III) Equity – It has to be constructed on sturdy relationships that inspire equity regarding

the surroundings, social justice, and sincere change.

- IV) Care – Organic farming needs to be via obligation, thinking about the environment and destiny generations.

The principle purpose is to marketplace splendid meal manufacturing in big quantity via boosting soil fertility, lowering pollutants, keeping off the use of insecticides and synthetic fertilizers, protecting genetic diversity and enhancing the organic farming tool cycles.

4. TYPES OF ORGANIC FARMING

There are two essentially dominant types of organic farming:

- I) Organic Farming: Pure organic farming is a very rare type of organic farming. It is because pure organic farming essentially is based on organic manure and biopesticides only for the cultivation of crops. It strictly forbids any type of inorganic chemical or insecticides for increasing yield or growth of the plant.
- II) Integrated Organic Farming: This is one of the categories of organic farming that combines the pure organic farming with controlled chemical fertilizers and blanket pest control. Throughout this kind of farming, manufacturers develop plants with the use of organic resources, as they'd in organic farming. However, to reinforce its nutritional value and to protect the plants from pests, they are going to utilize extra inputs.

5. COMPONENTS OF ORGANIC FARMING

Cropping rotation, vegetation remnants, biopesticides, biogas slurry, and other organic agricultural additives are all required. Vermicomposting has become an important part of organic farming because of its ability to improve soil fertility and vegetation development in a completely sustainable manner. The following are some of the aspects of organic farming:

1. Crop rotation: To maintain soil fertility and prevent insects, weeds, and diseases, plants should be cycled on the same ground for years or longer to teach sustainable agriculture. Using legumes in

rotation, for example, can boost soil fertility.

2. Crop Residue: India has a fantastic potential to recycle nutrients from crop residues, cereal straws, and pulses at some stage during organic farming. Inoculating agricultural residues with fungal species improves soil physio-chemical characteristics and crop yields.
3. In organic farming, organic manure is made from biological resources (plant, animal and human residues). Organic manure improves agricultural yields both directly and indirectly by increasing humic material uptake and assuring the utilization of major and minor plant components via soil microorganisms.
4. Compost, FYM, and green manure make up bulky organic manure, which contains significantly fewer nutrients than specialized organic wastes.
5. FYM is for Farm Yard Manure, which is a well-decomposed mixture of dung, urine, farm muck, and residual materials (roughages or fodder).
6. Large volumes of garbage (vegetable waste, weeds, stubble, Bhusa, sugarcane trash, sewage sludge, animal waste, human and business waste) are converted into compost manure by anaerobic decomposition. Compost is similar to FYM in that it is helpful to a wide range of soils and plant life.
7. Green Fertilizer: By plowing and incorporating undecomposed green plant tissues into the soil, green manuring increases the natural object and fertility of the soil. There is a natural count as well as nitrogen added to the manure crop (legume crop). Solar hemp (*Crotalaria juncea*), Dhaincha (*Sesbania aculeata*), Leguminous plant, Melilotus parviflor, *Vigna sinensis*, Berseem (*Trifolium alexandrinum*), and other manure plants are frequently employed.
8. Oilcake, blood meal, fishmeal, meat meal, and horn and hoof meal (targeted organic manures) are all organic and include more complete plant nutrients like nitrogen, phosphate, and potassium than bulky organic farming.
9. Vermicompost is a type of compost created by earthworms that dwell in the soil and consume organic waste before excreting it in digested form. These are high in macro and micronutrients, vitamins, growth hormones, and immobilised

microflora, which are all necessary for plant growth.

6. WHAT DOES CERTIFIED ORGANIC MEAN?

Agriculture that has been grown and processed according to a set of uniform criteria established by USDA-approved or autonomous state or private organizations is referred to be certified organic. All products that are labelled as "organic" must be certified. Annual submission of an organic system plan, as well as inspections of agricultural fields and processing facilities, are required for certification. Organic practices such as long-term soil treatment, buffering between organic farms and neighboring ordinary farms, and record-keeping are evaluated by inspectors. Inspections of the energy's cleaning and pest control procedures, problem storage and transportation, document maintenance, and audit management are all part of the quality check. Natural foods are gently processed without artificial additives or preservatives to keep them fresh. Organic certification forbids the use of synthetic agrochemicals, irradiation, and genetically modified food or components.

7. ECOLOGICAL PROFIT OF ORGANIC FARMING

The influence of organic agriculture on natural assets promotes interactions within the agroecosystem, which are important for agricultural production and environmental protection. Ecological services can be derived in several segments like ne is soil formation, conditioning, soil stabilization, waste recycling, carbon sequestration, nitrogen cycling, predation, pollination, habitat and biodiversity conservation, and inexpensive water. Performing inorganic farming may cause problems like floral variety, faunal variety, habitat variety, geography, soil organic interest, soil form, eating away, nitrate leaching, pesticide residues, greenhouse gas emissions, nutrient use, water use, and power use etc. which can be corrected by application of organics.

8. PRESENT STATUS OF ORGANIC FARMING IN INDIA

India's achievement in organic farming has given it a lot of capacity to create all types of natural products due to its various agro-climatic settings. Organic farming's hereditary way of life is a relatively new benefit in many American additives. This is an opportunity for natural producers to tap into a home market that is continuously growing in comparison to the export industry. India ranks tenth out of ten countries in terms of organically certified cultivable area, according to the "Agricultural and Processed Food Products Export Improvement Authority." The permitted area has 15% cultivable land (0.72 million hectares) while the remaining 85% (399 million hectares) is woodland land and wild site for small forest product gathering.

Organic products are shipped to the United States, multinational companies, Canada, Switzerland, Australia, New Zealand, Southeast Asian countries, the Middle East, the Republic of South Africa, and a variety of other countries. Soybean (70%) is the most popular product exported via Cereals & Millets, followed by Basmati (6%), processed food goods (5%), Basmati Rice (4%), Sugar (3%), Tea (2%), Pulses and Lentils (1%), dried fruits (1%), Spices (1%), and others.

Consistent with the Union Ministry of Agriculture and Farmers Welfare (as of March 2020), about 78 million hectares of farms are under organic farming in the united states which is 2% of the 140.1 million hectares of net sown place. Some states have led the way in enhancing organic farming insurance. Having 0.76 million hectares of land under organic farming, Madhya Pradesh takes the top spot of states, accounting for over a quarter of India's total organic agricultural area. Madhya Pradesh, Rajasthan, and Maharashtra make up around a third of the state's total area. 1/2 the arena below organic farming. The pinnacle 10 states account for approximately 80% of the complete vicinity underneath organic farming.

Table 1. Data for organic products (2013-2014)

Total Production	1.24 MMT
Total quantity exported	194088 MT
Value of total export	403 million USD
Total area under organic cultivation that has been certified	4.72 million hectares
Increase in the value of exports compared to the previous year	7.73 approx.

States:

- a) So far, Sikkim has been the only Indian country to completely become natural.
- b) A majority of states have fine a tiny low part of their net sown vicinity below organic farming.
- c) Even the exceptional three states (Madhya Pradesh, Rajasthan, and Maharashtra) that account for the maximum crucial location under natural cultivation have round 4.9%, 2.0%, and 1.6% respectively in their net sown location below organic farming.
- d) A few states like Meghalaya, Mizoram, Uttarakhand, Goa, and Sikkim have 10% or extra in their net sown place beneath organic farming. All of those states lie the hilly areas, besides Goa.
- e) Most of the alternative states have however 10% of their net sown location under organic farming.
 - Union Territories:
 - a) UTs like Delhi, Chandigarh, Dadra and Nagar Haveli, Lakshadweep, and Daman and Diu have 10% or extra of their net sown region underneath organic farming, but their agricultural region is notably very small.

9. ADVANTAGES OF ORGANIC FARMING

The following are some of the advantages of organic farming:

- It uses pollution-reduction measures to keep the environment healthy.
- It encourages sustainable agriculture development.
- It improves fitness of the soil.
- Organically grown agricultural items are of better quality. (length, taste, length, and scent are all longer).
- Organic farming increases the soil's water-retention capability.
- It improves nutrient availability, which is critical for plant development. (Vitamins, macro and micro nutrients)
- Natural farm goods are usually longer, taste better, and smell better (exceptional).
- Toxic substances are not present in the underground water beneath organic farming.
- Bulk density of a certain soil can be reduced by application of organics like vermicompost.

- Auxins, a growth hormone, found in vermicomposting, help plants develop faster.
- The soil's fertility and productivity will be improved by increasing the C:N ratio.

10. IMPACT OF ORGANIC FARMING ON DIFFERENT FACTORS

1. **Crop Productivity:** A well-known approach for enhancing crop yields is to increase natural dependency in the soil. According to Sharma and Mitra, the use of organic resources increased rice grain and straw output. Despite the fact that the same FYM boosted rice grain yields by 20% over NPK fertiliser, Ranganathan and Selvaseelan noticed that the programme employed mushroom and rice straw compost. According to Singh et al., [26] FYM @ 7.5 t ha⁻¹ produced significantly higher grain and straw yields than unfertilized regions. All rice yield-related features were expanded with FYM developing charges. Dhaincha (*Sesbania aculeata L.*) is a plant that can be utilised in organic gardening as a green manure crop and it increased the yield of rice and chickpea dramatically [26]. Stockdale et al. [2] explain the advantages of organic farming to both developed and developing countries. Many researchers believed that in an organically managed environment, inorganic agriculture is no longer a detrimental programme for the environment. Earthworms and bacteria collaborate in the biodegradation system to produce vermicompost, which is worm faeces mixed with worm castings.

Macro elements including N, P, K, Ca, and Mg, as well as microelements like Fe, Mo, Zn, and Cu, were provided by vermicompost [27]. The nitrogen, phosphorus, and potassium contents of the vermicompost were 0.74, 0.97, and 0.45 percent, respectively [28]. Organic farming's crop productivity in comparison to that of traditional farming is low-input agriculture [29]. Rice growth was higher under ongoing organic farming than it was under conventional farming, according to the findings. In low-capability locations, agroeconomic analysis of growing maize using compost and liquid manure fertilisation revealed much better overall performance than existing typical farmer practises of a blended software programme of manure and mineral fertilisers. The yields of maize grain were eleven to

seventeen percent higher than those obtained using conventional methods [30]. Crop productivity in the first year in an organically managed setting does not match that of following. As organic materials are supplied to the organic manipulation machine, soil fertility levels grow over time [31]. Furthermore, Surekha [32] observed that the usage of organic fertilisers resulted in a constant increase in grain yield over time.

Organic rice manufacturing inputs increased by 46, 25, and 22% over conventional rice production in three different sites [33], although rice yields only rose by 55, 94, and 82 percent, respectively. However, the organically grown rice get higher prices in the marketplace balance the cost of a lesser yield with more inputs [33]. Vegetables grown through the natural resources are rich in nutrients that are both beneficial to farmers and profitable to them.

According to Kalembasa [34], a vermicompost application @ 15 kg plot⁻¹ resulted a very excellent yield of tomato. Singh et al. (1997) reported that vermicomposting can promote microbial activities in chilli peppers (*Capsicum annuum* L.). Vermicompost improves the flora's performance, resulting in more branches and fruits in brinjal (*Solanum melongena* L.) (Tomar et al. 1998). Using vermicompost, many scientists were able to produce significantly more sweet peppers (*Capsicum annum* L. Var. Grossum). Reddy et al. (1998) also noticed that in most of the plants, vigour increased at first 15 days, at the time of flowering as well as at harvesting with the application of vermicompost (10 t ha⁻¹). According to many scientists vermicomposting considerably enhanced the leaf area in carrots (*Daucus carota* L.) blossoms. According to Samawat et al. [35] vermicompost had the highest impact on tomato root and fruit weight. In a vermicomposed treatment, fruit, shoot, and root weights increased by 3, 5, and 9 fold, respectively. Vermicompost used @5 or 10 t ha⁻¹ boosted pepper (*Capsicum annum* L.) flora more than inorganic fertilisers for both shoot weight and leaf area [36]. Vermicompost @ 200 g plant⁻¹ + FYM at 250 g/plant yielded tomato cv. S-22 and cabbage, according to Choudhary et al (*Brassica oleracea* L. Var. capitata) cv. Golden Acre, whilst vermicompost @ 100 g plant⁻¹ + FYM @ 500 g plant⁻¹ produced the bulk of k and soil organic carbon. Hashemimajd et al. [37] found that the vermicompost treatments resulted better than the control for shoot and root dry weight of tomatoes.

2. **Soil Fertility:** Soil fertility refers to a soil's ability to deliver vitamins to crops, as well as the soil's ability to provide nutrients to plants. Natural recall amount contents are a crucial component indication for assessing soil quality since they have an influence on the soil physical properties (porosity, water infiltration, bulk density, and water holding capability). It has been proven that as organic waste decomposes, macro and micronutrients are released into the soil, allowing plants to flourish. Using organic fertilisers and improving soil health by cultivating optimal soil physical conditions for plant growth and development can result in higher crop productivity over time. The addition of organic material in fresh form reduces soil response by absorbing soil as well as plant nitrogen for breakdown. The soil reaction and natural rely decomposition can both be increased with the addition of inorganic nitrogen. It is used to elevate the pH of the soil from 6.0 to 6.5, which reduces the population of large leaf weeds in urban areas [38]. To assess the effects of various natural ingredients like compost, farm yard manure (FYM), and Sesbania manure on soil chemical residences and fertility popularity on their own and in combination with chemical fertiliser. Rice and wheat plants were produced after the medicines were applied. After the harvest of each crop from all of the remedies, soil samples were collected, transported to the laboratory, arranged, and analysed for a variety of criteria. After each of the plants, the pH and SAR of the soil were decreased to their specific degrees, which guided all of the treatments. Compared to FYM and Sesbania manure, the efficiency of compost has proved to be much more [39]. By increasing soil organic matter content, natural input in agricultural farm equipment is expected to promote carbon sequestration. The findings that soil carbon concentrations rise in organically treated soil are, however, debatable [40].
3. **Soil Biodiversity:** Organic agriculture's cornerstone is improving soil fertility. Natural approaches offer excellent conditions for soil biotic and abiotic property through crop rotations and strip cropping, green manuring and natural fertilisation (animal dung, compost, crop residues), low tillage, and avoidance of

pesticides and herbicides. According to study undertaken in Europe, organically managed soils have been proven to considerably boost natural interest, general density, and the types of soil bacteria. Vitamin recycling and soil form are aided by biodiversity.

4. **Nature Conservation:** Without a question, farmers are the most essential managers of natural resources. Several studies show that organic agriculture protects non-agricultural biodiversity and provides a viable alternative in areas where human sports are permitted. Most significantly, the large land area around the included areas need agro-environmental management that ensures the landscape's safety and integrity. There is no cause to fear the loss of the organic world or pollution of air, water, and soil if farming surrounding and linking covered regions uses natural procedures. These buffer zones are essential for conservation success inside the covered regions. Humans' capacity to diplomacy in harmony with nature and get skills and knowledge from their land is enhanced by organic farming. Because the majority of the land has traditionally belonged to nearby villagers, organic farming allows them to maintain some control over their property, preserve land and biodiversity through their farming practises, reap the benefits for themselves while also conserving and beautifying the natural environment. Organic farming's direct influence on ecosystems may be seen at several sizes, including on-farm, farm margins, and the general environment. While being on biodiversity has been discussed in the preceding parts, the next sections will focus on organic agriculture's interactions with the larger landscape, notably inclusion areas and buffer zones.
5. **Rural Development:** Furthermore, organic and integrated farming are viable options on a variety of levels, contributing to thriving rural economies through long-term improvement. Indeed, new job prospects in agriculture, processing, and allied services are already visible within the natural area's rise. Further to the environmental blessings, the ones farming structures can convey sizable advantages to the monetary machine and additionally the social concord of rural regions. The provision of financial assistance and

various incentives to farmers who convert to organic agriculture is intended to aid the region's growth while also guiding related organisations toward the organic phenomenon.

6. **Pollution from Biomass Burning:** When a forested area is cleared for agriculture, thereafter biomass or the residual forest area is burn which releases toxic greenhouse gases. Traditional uses of burning include "reduce and burn" tropical farming, "firing" Savannah lands with pastor lists to encourage fodder growth, and clearing fallow ground and throwing off agricultural wastes, particularly rice. This combustion has had far-reaching global consequences and has increased pollution in tropical places far apart from the source of the flames. As a result of these trends, there should be a significant reduction in emissions from biomass burning. After wood extraction, deforestation is usually completed by burning, or a hearth is hired to dispose of the residual vegetation. The expected decrease in the rate of deforestation will halt the rise in pollution. Despite the fact that full-size grazing structures appear to be dominating, the change from large to widespread cattle production methods will reduce rangeland burning. Organic agriculture may be viewed as a manufacturing machine that favours renewable resources, recycling, and returning nutrients from waste products to the land. With the acknowledgment of cattle, organic agricultural establishments lay a strong priority on animal welfare and, as a result, the use of organic foods. Organic farming avoids the use of synthetic insecticides, herbicides, artificial fertilisers, boom promoters, and gene manipulation, as well as the prophylactic use of antibiotics and, as a result, the zoo technical use of hormones, and instead relies on the environment's very own processes for insect pest control and illnesses in evolving flora and rearing farm animals. Natural farmers, on the other hand, employ a wider range of tactics to help ecosystems and prevent pollution.

11. CONCLUSION

Organic farming can provide us high-quality food without compromising soil health or the environment on a long-term basis. There may be

a need for standardisation of adequate organic resources for specific crops for selling them in profitable. Due to its duties to provide food and nutritional safety, the entire location fundamentally cannot raise the cash for a one-time nature vacation. It also can provide huge number of job opportunities in this economical recession period owing to COVID-19 pandemic. Farming with organics can ensure that our soil will be able to sustainably feed the huge global population for a longer period of time. The most frequent consumers and proprietors of the earth's natural resources are farmers and individuals who dwell in the woods. It also can build self-regenerating food structures for land management, which encompasses both domesticated and wild biodiversity. In terms of the links between agriculture and nature conservation, the sustainable management of farms, as well as the exact agricultural and environmental guidelines, entails a high level of responsibility. Ensuring global food security also can be an opportunity to shift the global agriculture into organics and governments of different countries can support this by giving market-based incentives to the farmers.

Organic agriculture has already shown its potential to create biodiversity throughout the globe. However, it can bring us one step closer to a solution to a number of the challenges that traditional agriculture poses to biodiversity. Its remarkable proliferation might be a cost-effective biodiversity covering option. Research and development are vital for a better understanding of complicated ecological tactics, as well as the fact that farmers have manageable potential. Moreover, it combats pests and illnesses without the use of pesticides, which can be damaging to human health as well as the health of domestic and wild animals. Encouraging and protecting flora and wildlife through the creation of adequate habitats and the reduction of the use of hazardous pesticides. The possibility of using all renewable organic belongings for farm production while taking into account eco-machine and environmental safety in a way that allows for long-term usage of farm inputs is accessible. Organic gardening employs novel horticultural techniques, emphasising the value of genetic diversity and, eventually, the preservation of endangered plant species. As a result, organic farming is a viable option for ensuring safe food and a healthy environment.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Tscharrntke T, Grass I, Wanger TC, Westphal C, Batáry P. Beyond organic farming – harnessing biodiversity-friendly landscapes. *Trends in Ecology and Evolution*. 2021;36(10):919-930. Available: <https://doi.org/10.1016/j.tree.2021.06.010>
2. Stockdale EA, Lampkin NH, Hovi M, Keatinge R, Lennartsson EKM, et al. Agronomic and environmental implications of organic farming systems; 2001.
3. Singh M. Organic Farming for Sustainable Agriculture. *Indian Journal of Organic Farming*. 2021;1(1):1-8.
4. Chhonkar PK. Organic farming myth and reality. In *Proceedings of the FAI Seminar on Fertilizer and Agriculture Meeting the Challenges*; 2002.
5. Roos E, Mie A, Wivstad M, Salomon E, Johansson B, Gunnarsson S, Wallenbeck A, Hoffmann R, Nilsson U, Sundberg C, & Watson C A. Risk and opportunities of increasing yields in organic farming. A review. *Agronomy for Sustainable Development*. 2018;38:14. Available: <https://doi.org/10.1007/s13593-018-0489-3>
6. Sofia PK, Prasad R, Vijay VK. Organic farming-tradition reinvented; 2006.
7. Avery A. Going organic. *Crops and Soils*. 2007;40:8-12.
8. Yussefi M, Willer H. International Federation of Organic Agriculture Movements. *The world of organic agriculture: Statistics and future prospects*. Tholey- Theley. 2003;57.
9. Greenland D. Effects on soils and plant nutrition. *Shades of Green—A review of UK Farming Systems*. Royal Agricultural Society of England, Warwickshire. 2000;6-20.
10. Rothschild M. The butterfly gardeners by Miriam Rothschild and elive farell. *Great Britain*. 1998;128–130.
11. Moghtader M, Salari H, Farahm A. Evaluation of the antifungal effects of rosemary oil and comparison with synthetic borneol and fungicide on the growth of *Aspergillus flavus*. *Journal of Ecology and*

- the Natural Environment. 2011;3(6):210-214.
12. Arshad S, Shafqat A. Food security indicators, distribution and techniques for agriculture sustainability in Pakistan. *International Journal of Applied Science and Technology*. 2012;2(5).
 13. Chandran S, Unni MR, Thomas S. (Eds.). *Organic farming: Global perspectives and methods*. Woodhead Publishing; 2018.
 14. Paull J. Attending the first organic agriculture course: Rudolf Steiner's Agriculture Course at Koberwitz, 1924. *European Journal of Social Sciences*. 2011;21(1):64-70.
 15. Paull J. How Dr. Ehrenfried Pfeiffer Contributed to Organic Agriculture in Australia. *Journal of Bio-Dynamics Tasmania*. 2009;96:21-27.
 16. Simin MT, Rodić V, Glavaš-Trbić D. Organic agriculture as an indicator of sustainable agricultural development: Serbia in focus. *Economics of Agriculture*. 2019;66(1):265-280.
 17. Heckman J. A history of organic farming: Transitions from Sir Albert Howard's War in the Soil to USDA National Organic Program. *Renewable Agriculture and Food Systems*. 2006;21(3):143-150.
 18. Okubo H. *Kyusei Nature Farming: Historical Perspective, Present Status, and Prospects for Future Development with EM Technology*. In third international conference kyusei nature farming. Santa Bárbara, California; 1993.
 19. Klonsky K, Tourte L. Organic agricultural production in the United States: Debates and directions. *American Journal of Agricultural Economics*. 1998;80(5):1119-1124.
 20. Tomaš-Simin M, Glavaš-Trbić D. Historical development of organic production. *Economics of Agriculture*. 2016;63(3):1083-1098.
 21. Joachim S. Review of history and recent development of organic farming worldwide. *Agricultural sciences in China*. 2006;5(3):169-178.
 22. Meyer R, Priefer C. Project Team; 2003.
 23. Paull J. From France to the world: The international federation of organic agriculture movements (IFOAM). *Journal of Social Research & Policy*. 2010;1(2):93-102.
 24. Morgera E, Caro CB, Durán GM. Organic agriculture and the law. *FAO Legislative Study*, (107); 2012.
 25. Rundgren G. Best practices for organic policy: what developing country governments can do to promote the organic sector. Prepared under the Capacity Building Task Force (CBTF) Project Promoting Production and Trading Opportunities for Organic Agricultural Products in East Africa. New York and Geneva: United Nations; 2006.
 26. Singh KN, Prasad B, Sinha SK. Effect of integrated nutrient management on a Typic Haplaquant on yield and nutrient availability in a rice-wheat cropping system. *Australian Journal of Agricultural Research*. 2001;52(8):855-858.
 27. Khan A, Ishaq F. Chemical nutrient analysis of different composts (Vermicompost and Pitcompost) and their effect on the growth of a vegetative crop *Pisum sativum*. *Asian Journal of Plant Science and Research*. 2011;1(1):116-130.
 28. Palm CA, Swift MJ. Soil fertility as an ecosystem concept. In *Accomplishments and changing paradigm towards the 21st century*. Proceedings of the 17th world congress of soil science, Bangkok, Thailand. 2002;14-21.
 29. Tamaki M, Itani T, Yamamoto Y. Effects of organic and inorganic fertilizers on the growth of rice plants under different light intensities. *Japanese Journal of Crop Science*. 1999;68(1):16-20.
 30. Onduru DD, Diop JM, Van der Werf E, De Jager A. Participatory on-farm comparative assessment of organic and conventional farmers' practices in Kenya. *Biological agriculture & horticulture*. 2022;19(4):295-314.
 31. Yadav SK, Babu S, Yadav MK, Singh K, Yadav GS, Pal S. A review of organic farming for sustainable agriculture in Northern India. *International Journal of Agronomy*; 2013. Yadav SK, Yogeshwar S, Yadav MK, Subhash B, Kalyan S. Effect of organic nitrogen sources on yield, nutrient uptake and soil health under rice (*Oryza sativa*) based cropping sequence. *Indian Journal of Agricultural Sciences*. 2013;83(2):170-175.
 32. Surekha K. Nitrogen-release pattern from organic sources of different C: N ratios and lignin content, and their contribution to irrigated rice (*Oryza sativa*). *Indian Journal of Agronomy*, 2007;52(3):220-224.
 33. Chan KY, Dorahy C, Wells T, Fahey D, Donovan N, Saleh F, Barchia I. Use of

- garden organic compost in vegetable production under contrasting soil P status. Australian Journal of Agricultural Research. 2008;59(4):374-382.
34. Kalembara D, The influence of vermicomposts on the yield and chemical composition of tomato. Zeszyty problemowe postepow nauk rolniczych-polska akademia nauk. 1996;437:249-252.
 35. Samawat S, LAKZIAN A, Zamirpour AR. The effect of vermicompost on growth characteristics of tomato; 2001.
 36. Arancon NQ, Edwards CA, Bierman P, Metzger JD, Lee S, Welch C. Effects of vermicomposts on growth and marketable fruits of field-grown tomatoes, peppers and strawberries: the 7th international symposium on earthworm ecology. Cardiff-Wales. 2002. Pedobiologia. 2003;47(5-6): 731-735.
 37. Hashemimajd K, Kalbasi M, Golchin A, Shariatmadari H. Comparison of vermicompost and composts as potting media for growth of tomatoes. Journal of plant nutrition. 2004;27(6):1107-1123.
 38. Rafay M, Hussain T, Ruby T, Rehman F, Ahmad I, Abdullah M. Role of weeds in creating agro-ecological stability. Pakistan Journal of Agricultural Sciences. 2014; 51(3).
 39. Surekha K, Rao K V. Direct and residual effects of organic sources on rice productivity and soil quality of Vertisols. Journal of the Indian Society of Soil Science. 2009;57(1):53-57.
 40. Hongyeng L, Agamuthu P. Material/substance flow analysis of carbon flux in an organic and a conventional vegetable farm. Pakistan Journal of Agricultural Sciences. 2014;51(3).

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